9-18 PRECAST TRAFFIC CURB AND BLOCK TRAFFIC CURB

9-18.1 Precast Traffic Curb

9-18.1(1) Aggregates and Proportioning

The cement, fine and coarse aggregate, and reinforcing steel to be used in the manufacture of precast concrete traffic curb shall meet the following requirements:

1. Portland cement shall conform to the requirements of Section 9-01 except that it may be Type I Portland cement conforming to AASHTO M 85.
2. Aggregates shall conform to the requirements of Section 9-03 except that they shall be uniformly graded up to a maximum size of ⅜-inch and shall contain sufficient fine fractions to permit securing the type of surface finish specified herein. The aggregate shall be approved by the Materials Laboratory before it is used.
3. Reinforcing steel shall conform to the requirements of Section 9-07.1.
4. The cement concrete mix shall be composed of not less than 1 part Portland cement to approximately 2 parts of fine aggregate and 3¼ parts of coarse aggregate adjusted to secure proper workability. The Contractor will be allowed to use a different concrete mix if approved by the Engineer, provided that it develops not less than 4,000 psi compressive strength when tested at the age of28 days.

9-18.1(2) Mixing

The mixers shall be kept in good repair and be equipped with an automatic timing device and a positive device for regulating the quantity of water added to each batch. Such a device must be approved by the Engineer before use.

After all materials, including water, have been placed in the mixer, the materials shall be mixed for a period of not less than 1¾ minutes, or as much longer as may be necessary to produce a thorough and uniform mixture of the concrete. No water shall be added to any batch after the completion of the initial mixing period. Each batch of concrete shall be completely emptied from the mixer before placing more materials in it. A batch which has not been placed within 30 minutes from the time water was first added shall not be used.

The amount of water in the concrete shall be kept at a minimum consistent with the manufacture of dense curb, free from air bubbles and surface defects in excess of the tolerance limits specified.

9-18.1(3) Forms

Forms shall be of concrete or steel. The use of forms or molds made of plaster of paris, wood, or other absorptive material will not be permitted.

Bulkheads shall be tight fitting so that there is no leakage of mortar between the bulkhead and form.

The materials and methods used for lubricating the forms shall be such that they will not result in discoloration of the curb at any time. A minimum quantity of lubricant shall be used and all excess lubricant shall be removed.

9-18.1(4) Placing Concrete

The concrete shall be consolidated by external vibration, or by other means if approved by the Engineer, to produce a dense concrete throughout, having a minimum of air bubbles and honeycombing.

Reinforcing steel shall be placed and maintained in its proper position as shown in detail drawings.

Curb or buttons shall not be manufactured in an atmospheric temperature of less than 50ºF.

9-18.1(5) Removal of Forms

The curb shall be removed from the molds or forms in accordance with the instructions or by some other method acceptable to the Engineer.

The loosening of the curb from the molds shall be carefully performed to avoid excessive shock and straining of the curb. When, in the opinion of the Engineer, undue shock is required to remove the curb from the molds, the stripping operation shall be deferred until such time as the curb may be removed without breakage.

9-18.1(6) Curing Concrete

Immediately after the concrete has been placed and consolidated in the mold, each unit shall be placed in a curing room fitted with water sprays and maintained at a relative humidity of not less than 90 percent and a temperature of not less than 60ºF, nor more than 100ºF. Each unit shall remain in the curing room for a period of not less than 10 days, except that if Type III cement is used, the period in the curing room may be reduced to 5 days.

9-18.1(7) Finish

The curb shall have a smooth, glassy finish on all exposed surfaces.

Excess honeycombing in the back of the curb may be cause for rejection of the curb. Honeycombing areas in the back of the curb which, in the opinion of the Engineer, are not detrimental to the curb need not be patched. The workmanship of the bottom finish shall be such that no mechanical interlocking of the mortar bed and the curb bottom or anchor groove will occur.

9-18.1(8) Surface Treatment

As soon as the units have been taken out of the curing room and thoroughly surface dried to a depth of at least ¼-inch, two coats of a water repellent compound, meeting the requirements of Section 9-18.4, shall be brush applied. When the first coat has dried, the second coat of water repellent compound shall be applied.

9-18.1(9) Dimensions and Shape

The curb shall conform to the dimensions and shape shown in the Plans within a tolerance of ¼-inch in length and ⅛-inch in alignment.

9-18.1(10) Curb Lengths

Curb lengths shall be in accordance with the Standard Plans, except in special cases where different lengths are specified. Circular curbing shall be made only for such radii as called for in the detail plans.

9-18.1(11) Defective Curb

Not more than 2 percent of the top area in any one piece of curb shall be defective, and not more than 5 percent of the total length of the top corners of reflecting faces in any one piece of curb shall be broken or rounded. There shall be not more than 50 holes in any linear foot of curb. All curb having defects in excess of any of the above will be rejected immediately upon inspection after removal from the forms. However, failure to reject the curb at that time will not ensure its final acceptance. Ninety percent of the curb laid shall not have more than 10 percent of the maximum allowable number of defects specified above.

An air hole shall be defined as any hole ⅛-inch or larger in diameter or depth.

All defects within the limits permitted, apparent upon removal of forms, shall be repaired immediately.

The sum of the length of the lines of discoloration caused by a cracked mold in any one piece of curb shall not exceed 50 percent of the length of the curb, and the maximum length of any single line of discoloration shall not exceed 18-inches. 75 percent of the curb laid shall be entirely free from lines of discoloration. The employment of heat to obliterate lines of discoloration will not be permitted. The process used to obliterate lines of discoloration shall be subject to the approval of the Engineer.

The repairing of molds which are chipped or broken shall be done in a manner that the broken or chipped areas will not be apparent on the curb made in those molds.

All curb in which surface checking develops during the first five days after manufacture will be rejected.

Hidden air holes at or immediately below the exposed surface of the curb, in excess of the limits specified that are disclosed by testing the surface by means of a rubber hammer will be cause for rejection of the curb.

All curb in which cracking is in evidence immediately after removal from the molds will be rejected. A crack is defined as any separation of the concrete of a continuous length greater than 3-inches.

All curb which varies in dimensions, alignment, or surface contour in excess of the tolerance specified will be rejected.

Failure to comply with the plans, Specifications, or instructions of the authorized representative of the Contracting Agency in the manufacture and laying of any curb will be cause for rejection of such curb.

9-18.1(12) Repairing Curb

Curb having defects which are not sufficient cause for its rejection shall be neatly repaired immediately after removal from the molds in a manner subject to the approval of the Engineer. However, no patching or other repairs shall be made without the permission of the Engineer. Patches shall be undercut if, in the opinion of the Engineer, this operation is necessary to achieve a satisfactory patch.

All holes larger than 1/16-inch diameter in the exposed surface of acceptable curb or buttons shall be filled with cement mortar.

9-18.1(13) Identification Marking

The date of manufacture, the length, and identification number corresponding to the detail layout shall be marked in black paint on the back or end of each piece of curb.

Rejected curb shall be marked on the back or end surfaces in a practical and semi-permanent manner to identify each cause of rejection.

9-18.1(14) Shipping

No unit of curb shall be shipped from the manufacturing plant prior to 21 days after manufacture, except, however, that if Type III cement has been used, the units may be shipped 14 days after manufacture.

9-18.1(15) Sampling and Inspection

The Contractor shall submit, for the approval of the Engineer, an advance sample of curb which shall be at least equivalent in color, surface texture, and bottom finish to the standard as set forth in these Specifications. No repairing of any kind shall be done on the advance sample. Upon approval, the advance sample shall be stored at the plant or site of manufacture in a location readily accessible to the Inspector where there is adequate daylight for examination. The advance sample shall be protected from damage and discoloration and shall be used as a standard of comparison for color, surface texture, and bottom finish for all curb manufactured. All curb furnished shall be equivalent in the foregoing respects.

The inspection at the plant will be made just prior to shipment, at which time examination will be made of the alignment, contour, color, cracks, surface damage or discoloration, broken corners or edges, and any other defects which may have developed, and to check the laboratory test reports for strength. However intermediate inspections may be made to determine surface checking and hidden air holes if it is impractical to examine for these defects at the final inspection.

9-18.2 Vacant

9-18.3 Block Traffic Curb

In construction of the block traffic curb, the Contractor shall have the option of using either length block shown in the plans, provided the same length block is used throughout the entire project.

The curb units shall be made from Portland cement and high quality sand and gravel, the proportions of which will be left to the discretion of the producer as long as the unit develops a minimum compressive strength of 1,600 psi at 28 days when tested for end loading.

The proportions of sand, gravel, and cement, the type of forms used, and the method of compacting the concrete in the forms shall all be such that as dense, smooth, and uniform a surface as is practicable for a concrete masonry unit is obtained on the finished curb units. The faces that are to be exposed shall be free from chips, cracks, air holes, honeycomb, or other imperfections except that if not more than 5 percent of the curb units contain slight cracks, small chips not larger than ½-inch, or air holes not more than ½-inch in diameter or depth, this shall not be deemed grounds for rejection. The units used in any contiguous line of curb shall have approximately the same color and surface characteristics.

9-18.4 Water Repellent Compound

The water repellent compound shall be a clear, penetrating type, silicone resin base compound containing no filler or other material which will leave a film on the surface of the masonry after it is applied. It shall be of such consistency that it can be applied readily by brush or spray to the masonry at atmospheric temperature down to -20ºF.

The average absorption of three test specimens treated with the water repellent compound, when tested in accordance with the methods used in the State Materials Laboratory, shall not exceed 2 percent after being partially immersed in water for 72 hours immediately after curing.

The average moisture vapor transpiration (breathing) of three test specimens, when tested in accordance with the methods used in the State Materials Laboratory, shall be not less than 50 percent at seven days.

The water repellent compound shall be approved by the State Materials Laboratory before it is used.

9-18.5 Sodium Metasilicate

Sodium metasilicate shall comply with ASTM D 537.